

Att2_WE14_RisingSun_WEGHG_2ofTotal4

(attachment consists of 8 pages)

Project 1: California Youth Energy Services- Water Reduction Investment Project

Assumptions, methodologies, analyses sources used:

Measure: 'Drop a Brick' device

<http://www.projectdropabrick.org/>

WATER SAVINGS		
GPF Saved Per Brick	Avg. Daily Flush Per Toilet	Gallons Saved Per Brick, Per Year
0.4	5.05	737.3

Program Year	Homes Served	Toilets ≥ 1.6 GPF	Avg. Number of Toilets ≥ 1.6 GPF Served Per Home	Gallons Saved, Assuming 1 Brick Per Home	Gallons Saved, Assuming 1 Brick Per Toilet ≥ 1.6 GPF
2017*	6,250.00	8,214	1.31431	4,608,125.00	6,056,504.60
2016*	6,250.00	8,214	1.31431	4,608,125.00	6,056,504.60
2015*	5,000.00	6,572	1.31431	3,686,500.00	4,845,203.68
2014	4,444.00	5,553	1.24955	3,276,561.20	4,094,226.90
2013	3,355.00	4,524	1.34844	2,473,641.50	3,335,545.20
2012	3,388.00	4,963	1.46488	2,497,972.40	3,659,219.90
2011	3,380.00	4,037	1.19438	2,492,074.00	2,976,480.10

* 2015 numbers are projected with 250 homes per site, and toilets ≥ 1.6 GPF are based off of the previous 4 program year percentages and averaged out. All GPM saved numbers are based off of .4 gallons saved per flush and given the average American toilet is flushed 4 times a day.

Program Year	Baseline (pre-project) Volume of Water Associated With Project	Volume of Water That Will Be Delivered After The Project
2017*	111,865,439.01	107,257,314.01
2016*	111,865,439.01	107,257,314.01
2015*	89,492,351.21	85,805,851.21
	104,407,743.08	100,106,826.41

* 2015, 2016, and 2017 numbers are projected with 250 homes per site, and toilets ≥ 1.6 GPF are based off of the previous 4 program year percentages and averaged out. All GPM saved numbers are based off of .4 gallons saved per flush and given the average American toilet is flushed 4 times a day. Average gallons used per year in flushing was based off of the average California home use of 37.31 gallons l.

† <http://water.cityofdavis.org/Media/PublicWorks/Documents/PDF/PW/Water/Documents/California-Single-Family-Home-Water-Use-Efficiency-Study-20110420.pdf>

AND <http://blogs.kqed.org/lowdown/2014/01/23/how-much-water-do-californians-use-each-day-and-what-does-a-20-reduction-look-like/>

Measure: Low Flow Showerheads and Aerators

PG&E Work Paper: PGECODHW125 R0 Low Flow Showerheads Aerators (attachment:Att2_WE14_RisingSun_WEGHG_3ofTotal4)

USEPA Water Conservation Plan Guidelines_app_b508 (attachment:Att2_WE14_RisingSun_WEGHG_4ofTotal4)

Steps		Calculations	MG/Year	NOTES	Links
Step 1:	Enter the baseline (pre-project) volume of water	50812228.16	MG/year	Water District Report: Replaced Measures "Before" - converted from GPM to gallons/year	http://environment.nationalgeographic.com/environment/freshwater/water-calculator-methodology/

	associated with the project			# showerheads*average GPM*8*5*3*52 / # aerators*average GPM*8*365*3	
Step 2:	Enter the volume of water that will be delivered after the project is implemented.	25754143.04	MG/year	Water District Report: Replaced Measures "After" - converted from GPM to gallons/year # showerheads*average GPM*8*5*3*52 / # aerators*average GPM*8*365*3	http://www.epa.gov/WaterSense/docs/app_b508.pdf
Step 3:	Enter the volume of hot water saved from the project's electric water heating system (the summation of step 3 and step 4 must not exceed annual volume of water savings). If	11338783.52	MG/year	Program Report - compared # of gas (90.5%) vs electric (9.5%) Aerator - assumed 50% hot vs cold usage Showerhead - assumed 100% hot usage Used difference between pre-project and post-project	

	not applicable, enter "0".				
Step 4:	Enter the volume of hot water saved from the project's natural gas water heating system (the summation of step 3 and step 4 must not exceed annual volume of water savings). If not applicable, enter "0".	1190259.043	MG/year	See above	
Step 5:	Enter the useful life in years for the project	10	years	PGE Workpaper EUL	
Step 6:	Enter the percentage of water that is	0			

	imported				
Step 7:	Enter the Energy Intensity (EI) of the System associated with the project's water savings	0.000102074	kWh/MG	Water district report - kWh savings from measure installation	
Step 8:	Enter the total output emission rate specific to the power supplier or use the default value of 0.278	0.278	kg CO2e/kWh	Used default value	
Step 9:	Enter EI associated with the Supply and Conveyance segment of the imported water or enter "0" if imported	0	kWh/MG		

	water is not applicable				
Step 10:	Enter any additional annual energy savings from energy efficiency and renewable energy (EE/RE), etc.	2557.783333	kWh/year	Water district report - kWh savings from measure installation	

Showerheads:

Total gpm saved by California Youth Energy Services in 2014: 946.3 per CYES Program Report

(Program report is generated by Rising Sun's custom Ruby-on-Rails web application attached to a MySQL database. Energy-saving data based on the DEER database or CPUC dispositions, see monitoring plan for additional details)

Average shower length per the EPA: 8 mins

Average Bay Area household size (Census data): 2.69 **OR** CYES Average per Program Report: 3

Calculate based on 7 showers per week or 365 showers per year **OR** average 5 showers per week per EPA consultant Aquacraft

<http://environment.nationalgeographic.com/environment/freshwater/water-calculator-methodology/>

GPM*Average shower time*Average HH size*Showers per week per person*52 weeks = gallons/year

Aerators:

Total GPM saved in 2014: 1436 per CYES Program Report

(Program report is generated by Rising Sun's custom Ruby-on-Rails web application attached to a MySQL database. Energy-saving data based on the DEER database or CPUC dispositions, see monitoring plan for additional details)

Average usage: http://www.epa.gov/WaterSense/docs/app_b508.pdf - Assume 8 minutes/person/day for bath and kitchen combined

Average Bay Area household size (Census data): 2.69 **OR** CYES Average per Program Report: 3

GPM*Average faucet time per day*Average HH size*365 days per year = gallons/year

Additional Notes& Links:

<http://environment.nationalgeographic.com/environment/freshwater/water-calculator-methodology/>

According to Aquacraft, average daily water use from faucets is 10.9 gallons per capita per day (gpcd) in a standard home, 8.2 gpcd in a conserving home.

According to Aquacraft, average daily water use from showerheads is 11.6 gallons per capita per day (gpcd) in a standard home, 8.7 gpcd in a conserving home.

Aquacraft's baselines assume that the average person takes five showers a week at eight minutes each.

If you don't use a dishwasher, we are assuming that you wash dishes by hand, at about 20 gallons a washing, per EPA estimates. Assuming you handwash dishes just once a week, a very low estimate, we're adding 3 gpcd to your baseline. If you wash dishes by hand just sometimes, we're adding 1.5 gpcd to your footprint.

Water Use in the CA Home 2010: <http://www.cbia.org/go/cbia/?LinkServID=E242764F-88F9-4438-9992948EF86E49EA>

<http://www.wsscwater.com/home/jsp/content/water-usagechart.faces>

WaterSense (like Energy STAR for water): http://www.epa.gov/watersense/our_water/start_saving.html#tabs-3

Some assumptions/averages from the EPA:

<http://www.epa.gov/WaterSense/pubs/indoor.html>

Straight conversion GPM to gallons/year (no usage adjustment)

http://www.convert-me.com/en/convert/flow_rate_volume/gallon_min.html

[http://www.convertworld.com/en/volumetric-flow-rate/Gallons+per+minute+\(U.S.+liquid\).html](http://www.convertworld.com/en/volumetric-flow-rate/Gallons+per+minute+(U.S.+liquid).html)

This provides a conversion rate: https://dnrc.mt.gov/wrd/water_rts/wr_general_info/wrforms/615.pdf - 1GPM=1,440 gallons/day

Measure: Sprinkler Nozzle

Total gpm saved by California Youth Energy Services in 2014: 1,394 homes had an irrigation system per CYES Program Report

(Program report is generated by Rising Sun's custom Ruby-on-Rails web application attached to a MySQL database. Energy-saving data based on the DEER database or CPUC dispositions; see monitoring plan for additional details)

Calculations based on installing nozzles on 25% of homes: 349 homes in 2014
Estimate for 2015, 2016 & 2017: 1,622.85

EPA average home uses 320 gallons of water/day of which 30% is devoted to outdoor use: 96 gallons per day

<http://www.epa.gov/WaterSense/pubs/outdoor.html>

--Use 30% less water per head

--Calculator: http://toro.com/irrigation/psn_calculator.htm

--Measure: <http://www.toro.com/en-us/professional-contractor/irrigation/spray-head-nozzles/Pages/Model.aspx?pid=precisionseriespraynozzles>

--Flow: .04-2.4 GPM

--Average US household: 96 gallons/day on outdoor uses (<http://www.epa.gov/WaterSense/pubs/outdoor.html>)

Step 1: 1,622.85 homes x 96 gallons/day x 182.5 days (50% of year). Gallons per year 9,477,44. Over 3 years 28,432,332 gallons.

Step 2: Spray nozzles use 30% less water. Gallons per year 9,477,44 x 0.70 = 66,3420.8 gallons/year. Over 3 years 199,0262.40 gallons.

Step 3: No hot water used in garden. So 0.

Step 4: No hot water used in garden. So 0.

Step 5: Sprinkler nozzles life span

Step 6: No water imported

Step 7: No energy used for outside irrigation

Step 8: Default value

Step 9: No water imported

Step 10: No energy used for outside irrigation